



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/511,188	02/23/2000	Kenji Shimoyama	000202	4217
23850	7590	11/19/2003	EXAMINER	
ARMSTRONG, KRATZ, QUINTOS, HANSON & BROOKS, LLP 1725 K STREET, NW SUITE 1000 WASHINGTON, DC 20006			FLORES RUIZ, DELMA R	
			ART UNIT	PAPER NUMBER
			2828	

DATE MAILED: 11/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/511,188

Applicant(s)

SHIMOYAMA ET AL.

Examiner

Delma R. Flores Ruiz

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.


- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-53 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

  
PAUL IP  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 10
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 42 – 45, 48, and 51 – 53 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimoyama Kenji et al (EP 0867949 A2).

***Regarding claims 1, 42 – 45, 48, and 51 – 53,*** Shimoyama discloses a semiconductor optical device apparatus comprising: a substrate (Fig. 3 Character 301); a compound semiconductor layer containing an active layer (Fig. 3 Character 303); a protection film (Fig. 3 Character 305 and 310) having a stripe-shaped opening formed on the compound semiconductor layer (Page 6, lines 2 – 8); and a ridge type compound semiconductor layer having a smaller refractive index than the refractive index of the active layer (Page 5, Lines 28 – 58, Pages 6, Lines 1 – 23); the ridge type compound semiconductor layer being formed as to cover the stripe-shaped opening (Pages 5 - 8),

wherein the compound semiconductor layer, the protection film and ridge type compound semiconductor layer are formed on the substrate, and wherein the semiconductor optical device apparatus satisfies either or both of the following conditions (a) and (b):

(A): a width ( $W_c$ ) at an opening center of the stripe-shaped opening is different from a width ( $W_f$ ) of the opening front end; and

(B): a width ( $W_c$ ) at an opening center of the stripe-shaped opening is different from a width ( $W_r$ ) of the opening rear end (see Figs. 1 – 6, Abstract, Pages 2 – 10).

**Regarding claim 42** Shimoyama discloses the protective film (see Fig. 3c, Characters 305 and 310) is formed on a ridge top and a side surface of the ridge type compound semiconductor layer.

**Regarding claim 43** Adachi discloses the contact film (see Fig. 3, Character 9) is formed to cover a ridge top and side surface of the ridge type compound semiconductor layer.

**Regarding claim 44** Shimoyama discloses a crystal-grown plane of the substrate is plane or its crystallographically equivalent plane (Page 5, Lines 19 – 27, and wherein a longitudinal direction of a stripe-shaped opening of the protection film is

[01 – 1] direction or its crystallographically equivalent direction (see Figs. 3 - 10, said limitation only recites facts and features that are well known and expected, the same features that essentially result from the use or application of a crystal-grown plane of the substrate is plane or its crystallographically equivalent plane, and wherein a longitudinal direction of a stripe-shaped opening of the protection film is [01 – 1] direction or its crystallographically equivalent direction (Pages 5 – 10).

**Regarding claim 48** Shimoyama discloses one layer among the clad layer (see Fig. 3, Character 302 and 304) having a refractive index smaller than that of the active layer formed below the active layer, the active layer, and the clad layer having the refractive index smaller than that of the active layer formed on the active layer is made of a compound represented by  $(Al_x Ga_{1-x})_y In_{1-y}P$  (Pages 5 – 10).

**Regarding claim 51 – 53** Shimoyama discloses the semiconductor optical device apparatus is a semiconductor laser, semiconductor light-emitting device and semiconductor optical amplifier (see Figs. 1 – 6, Abstract, Pages 2 – 10).

### **Claim Rejections - 35 USC § 103**

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 – 41, 46 – 47, and 49 – 50 are rejected under 35 U.S.C. 103(a) as being obvious over Shimoyama Kenji et al (EP 0867949 A2) in view of Adachi et al (5,974,068).

**Regarding claims 2 – 41** Shimoyama Kenji discloses the claimed invention except for the semiconductor optical device apparatus satisfies either or both of a conditions of  $IW_f - W_c \geq 0.2 \mu$  and a condition  $IW_r - W_c \geq 0.2 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $IW_f - W_c \geq 0.5 \mu$  and a condition  $IW_r - W_c \geq 0.5 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $IW_f - W_c \leq 0.5 \mu$  and a condition  $IW_r - W_c \leq 0.5 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $IW_f - W_c \leq 5 \mu$  and a condition  $IW_r - W_c \leq 5 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $IW_f - W_c \leq 3 \mu$  and a condition  $IW_r - W_c \leq 3 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $IW_f - W_c \leq 2 \mu$  and a condition  $IW_r - W_c \leq 2 \mu$ , the semiconductor optical device apparatus satisfies a condition of  $W_c \geq 2.2 \mu$  and  $W_c \leq 50 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $W_f \geq W_c$  and  $W_r \geq W_c$ , and  $W_f =$

$W_r$ , the semiconductor optical device apparatus satisfies both of  $W_f \leq 3 \mu$ ,  $500 \mu$  and  $W_r \geq 3 \mu$  and  $500 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $W_f / W_c \geq 1.2 \mu$ ,  $1.5 \mu$ ,  $50 \mu$ ,  $10 \mu$ ,  $0.2 \mu$ ,  $0.1 \mu$ , and  $W_r / W_c \geq 1.2 \mu$ ,  $1.5 \mu$ ,  $50 \mu$ ,  $10 \mu$ ,  $\mu$ ,  $0.2 \mu$ ,  $0.1 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $W_f \leq W_c$  and  $W_r \leq W_c$ , and  $W_f = W_r$ , the semiconductor device apparatus satisfies both of  $W_f \geq 0.5 \mu$  and  $W_r \leq 0.5 \mu$ , the semiconductor device apparatus satisfies both of  $W_f \leq 0.5 \mu$  and  $W_r \leq 10 \mu$ , the semiconductor device apparatus satisfies both  $W_f / W_c \geq 0.02$ ,  $0.1$ , and  $W_r / W_c \geq 0.02$ ,  $0.1$ , the semiconductor device apparatus satisfies both  $W_f / W_c \leq 0.85$ ,  $0.7$ , and  $W_r / W_c \leq 0.85$ ,  $0.7$  and the semiconductor device optical apparatus satisfies either  $W_f \geq W_c \geq W_r$  or  $W_f \leq W_c \leq W_r$ . The semiconductor layer containing the active layer includes a layer in which an In content of the compound crystal is 5% and 1% or higher, and wherein the In content of the compound crystal of the ridge type compound semiconductor laser is 10% or less.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to the semiconductor optical device apparatus satisfies either or both of a conditions of  $|W_f - W_c| \geq 0.2 \mu$  and a condition  $|W_r - W_c| \geq 0.2 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $|W_f - W_c| \geq 0.5 \mu$  and a condition  $|W_r - W_c| \geq 0.5 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $|W_f - W_c| \leq 0.5 \mu$  and a condition  $|W_r - W_c| \leq 0.5 \mu$ , the semiconductor optical device apparatus satisfies either or both of a

Art Unit: 2828

conditions of  $|W_f - W_c| \leq 5 \mu$  and a condition  $|W_r - W_c| \leq 5 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $|W_f - W_c| \leq 3 \mu$  and a condition  $|W_r - W_c| \leq 3 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $|W_f - W_c| \leq 2 \mu$  and a condition  $|W_r - W_c| \leq 2 \mu$ , the semiconductor optical device apparatus satisfies a condition of  $W_c \geq 2.2 \mu$  and  $W_c \leq 50 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $W_f \geq W_c$  and  $W_r \geq W_c$ , and  $W_f = W_r$ , the semiconductor optical device apparatus satisfies both of  $W_f \leq 3 \mu$ ,  $500 \mu$  and  $W_r \geq 3 \mu$  and  $500 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $W_f / W_c \geq 1.2 \mu$ ,  $1.5 \mu$ ,  $50 \mu$ ,  $10 \mu$ ,  $0.2 \mu$ ,  $0.1 \mu$ , and  $W_r / W_c \geq 1.2 \mu$ ,  $1.5 \mu$ ,  $50 \mu$ ,  $10 \mu$ ,  $\mu$ ,  $0.2 \mu$ ,  $0.1 \mu$ , the semiconductor optical device apparatus satisfies either or both of a conditions of  $W_f \leq W_c$  and  $W_r \leq W_c$ , and  $W_f = W_r$ , the semiconductor device apparatus satisfies both of  $W_f \geq 0.5 \mu$  and  $W_r \leq 0.5 \mu$ , the semiconductor device apparatus satisfies both of  $W_f \leq 0.5 \mu$  and  $W_r \leq 10 \mu$ , the semiconductor device apparatus satisfies both  $W_f / W_c \geq 0.02$ ,  $0.1$ , and  $W_r / W_c \geq 0.02$ ,  $0.1$ , the semiconductor device apparatus satisfies both  $W_f / W_c \leq 0.85$ ,  $0.7$ , and  $W_r / W_c \leq 0.85$ ,  $0.7$  and the semiconductor device optical apparatus satisfies either  $W_f \geq W_c \geq W_r$  or  $W_f \leq W_c \leq W_r$ . The semiconductor layer containing the active layer includes a layer in which an In content of the compound crystal is 5% and 1% or higher, and wherein the In content of the compound crystal of the ridge type compound semiconductor laser is 10% or less, since it has been held that discovering an optimum



value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### ***Response to Arguments***

Applicant's arguments filed 9/10/2003 have been fully considered but they are not persuasive. Applicant's arguments with respect to claims 1 – 53 have been considered but are moot in view of the new ground(s) of rejection.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2828

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Delma R. Flores Ruiz whose telephone number is (703) 308-6238. The examiner can normally be reached on M - F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Ip can be reached on (703) 308-3098. The fax phone number for the organization where this application or proceeding is assigned is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-3431.



Delma R. Flores Ruiz

Examiner

Art Unit 2828

DRFR/PI

November 13, 2003



Paul Ip

Supervisor Patent Examiner

Art Unit 2828